2 (Truc : Loads)	Shipping (Not Filled)	[redacted]	[redacted]
7 (Truc : Loads)	Shipping (Filled)	[redacted]	[redacted]
		SUBTOTAL	NA
		TAXES	0.00
		TOTAL	NA

1) Quote valid for 45 days.
2) Delivery 4-6 weeks ARO or to meet schedule
3) Shipping Costs to [redacted]
4) All taxes extra as applicable.

Hardcore Composites Authorized Signature _____ Date _____

Hardcore Composites Operations LLC
618 Lambsons Lane
New Castle, Delaware 19720
302-472-0815 Fax 302-472-0816

Quote No. 1318

Project: [redacted]

To:

Quote prepared by:
Jeff Pote

QUOTE DATE	F.O.B. POINT	TERMS
8/9/04	New Castle, DE	20% Down, Net 30 for completed, stored materials

QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT
3 360-ft (84 piles @ 40-ft)	18-5 FRP Pile	[redacted]	[redacted]
4	Composite SIP Forms	[redacted]	[redacted]
		SUBTOTAL	[redacted]
		TAXES	0.00
		TOTAL	[redacted]

1) Quote valid for 60 days.
2) All taxes extra as applicable.

Hardcore Composites Authorized Signature

Date

Exh 4

HARDCORE™ COMPOSITES

Hardcore Composites Operations LLC
618 Lambsons Lane
New Castle, Delaware 19720

Quote No: 0091504-1

Quote prepared by: Jeff Pote, Hardcore Composites

QUOTE DATE	F.O.B.	TERMS
Wednesday, September 15, 2004	Job Site	T.B.D.

QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT
4,485 lin.ft. (69 piles @ 65')	10" OD x 2-ply Hardcore Composite pile with 0.18" thick structural wall. Includes a 12.75" OD x 1.16" thick HDPE (high-density polyethylene) wear sleeve to protect the top portion of the pile from abrasion due to vessel contact. Pile will be filled with concrete prior to shipment to jobsite. HDPE wear sleeve will be shipped separately. Contractor must place HDPE sleeve after pile is driven to the required elevation. Quoted pile well exceeds both the bending moment and bending stiffness (EI) of comparable diameter Lancaster Composite pile. Independent laboratory flexural test results from Lehigh University attached.	$26.25 / ft.	$117,731.25
10 Truckloads	Freight estimate - Extended trailers and escorts required. Pile weight is estimated at 85 lbs/ft OR 5,525 lbs/pile. Seven (7) piles per truckload.	$1,100 / ea.	$11,000.00
		TOTAL	$128,731.25

NOTES:

1) Quote valid for 30 days.
2) Sales tax extra as applicable.
3) Availability: To meet construction schedule.

Copy to Scott Hemphill, Hardcore Composites

DEPOSITION EXHIBIT #4 10/12/04 ASR

Thank you for the opportunity to quote this project!

Exh 5

SEAWARD

August 7, 2003
S 03 - 0374

E/ 7827

Tim Linden
Orion Construction
T: (813) 839-8441
F: (813) 831-7498

Re: Pier 12 San Diego

Thank you for the opportunity to provide the following quotation.

Product	Reinforcement	Qty.	Length
FIBERGLASS MARINE FENDER PILES			
HARDCORE COMPOSTIE Fender Piles - Option A			
12.75" OD x .027" wall Fiberglass Marine Fender Piles that meet spec requirements, including: vinyl ester resin, triaxial e-glass fabric, inner polyethylene layer, and manufactured using closed resin infusion process.		74 each	60.00 ft
Total delivered CIF to San Diego, CA:			**$162,350**
HARDCORE COMPOSTIE Fender Piles - Option B			
12.75" OD x 0.27" wall Fiberglass Marine Fender Piles that do not meet all spec requirements.		74 each	60.00 ft
Total delivered CIF to San Diego, CA:			**$121,280**

The above quoted piles are hollow. Contractor will have to precast with concrete. High Density Polyethylene Pipe Sleeves called for Section 02463, Subsection 2.3.2.1 can be ordered directly from the distributer in California. Please contact P&F Distributors @909-596-6887. We recommend the 16" OD, DR 13.5 (13.63" ID)

Sales tax: Applicable taxes are not included in the above pricing.
Delivery: To suit construction schedule.

We look forward to the opportunity to work together with you on this project. Please advise should you have any questions or require additional information.

Yours sincerely,
Bryan Maphis

TRELLEBORG

SEAWARD, a division of Trelleborg Engineered Products, Inc., 3470 Martinsburg Pike, P.O. Box 98, Clearbrook, VA 22624, USA
Phone (540) 667-5191 Fax (540) 667-7987 E-Mail mail@seaward.com Internet www.seaward.com

DEPOSITION EXHIBIT #5 10/12/06 JSR

Exh 6

Fax

Date: 9/15/04

To: Bob Schmidt, E.I.C.
Phone: 973-315-0200
Fax: 973-315-0218

From: Steve Shannon
Phone: 717-625-3740
Fax: 717-625-3741

Pages: 11

Subject: Hardcore Composite Fender Pile Quote
South Jersey Port – Piers 1 & 1a

Bob:

Thank you for taking time to talk with me this morning. For your review, I have transmitted the following:

- HC Pile Quote (1 pg.)
- HC Pile Design Guide (4 pgs)
- Lehigh University flexural test report (5 pgs)

As you will see, the delivered price is **$28.70 per lineal foot.** That price includes the required HDPE wear sleeve for abrasion protection. Please note, the flexural properties (bending moment and bending stiffness-EI) of the quoted Hardcore Composite Pile wall exceed a comparable sized (O.D.) Lancaster Composite pile.

Thanks again for the opportunity to quote this project. Please call me with any questions.

Best Regards,

Steve

DEPOSITION EXHIBIT #6 10/12/04

Exhibit C

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

ORIGINAL

LANCASTER COMPOSITE, INC.,

Plaintiff,

vs.

HARDCORE COMPOSITES OPERATIONS, LLC, and W. SCOTT HEMPHILL, a Delaware corporation,

Defendants

Civil Action
No. 04-1414 SLR

Deposition of W. SCOTT HEMPHILL, taken pursuant to notice at the law offices of Seitz, VanOgtrop & Green, PA, 222 Delaware Avenue, Wilmington, Delaware, beginning at 10:03 a.m., on Tuesday, June 6, 2006, before Allen S. Blank, Registered Merit Reporter and Notary Public.

APPEARANCES:

GEORGE C. WERNER, ESQUIRE
BARLEY SNYDER, LLC
126 East King Street
Lancaster, PA 17602
- and -
SALVATORE ANASTASI, ESQUIRE
BARLEY SNYDER, LLC
1000 Westlakes Drive, Suite 275
Berwyn, PA 19312

For - Plaintiff

ALLEN S. BLANK, RMR
COURT REPORTER - NOTARY PUBLIC, PA, DE
90 Mt. Pleasant Road, Paradise, PA 17562
(717) 687-8942

APPEARANCES: CONTINUED

W. SCOTT HEMPHILL
517 Riblett Lane
Wilmington, DE 19801

Pro Se

ALSO PRESENT:

ROBERT GREEN

* * * * * *

WILLIAM SCOTT HEMPHILL,

the deponent herein, having first been duly sworn on oath, was examined and testified as follows:

EXAMINATION

BY MR. WERNER:

Q All right, sir. Would you please state your full name?

A William Scott Hemphill.

Q Mr. Hemphill, as you know, my name is George Werner. I'm an attorney and I'm representing Lancaster Composite in a patent infringement action that was brought initially against Hardcore Composites and against you individually.

This is a deposition. And I believe you have some general idea of the purpose and the procedure of a deposition. But I'll just put a couple of instructions out here to begin with.

First, I'm going to be asking you a series of questions. If at any time you haven't heard or don't understand my question, please tell me and I'll repeat it or explain it as necessary. Do you understand that?

A Yes, I do.

Q If at any time during the course of the deposition you wish to take a break, just please tell me that and I'll certainly accommodate that for any reason that you want it, to walk down the hall, to get a breath of fresh air or whatever and I'll certainly accommodate that. Do you understand that?

A Yes.

Q So far, you have been doing a very good job of using words for answers and I'll ask, during the deposition, that you continue to do that as opposed to simply gestures or nods so there is no confusion as to what your answer is about the question. Do you understand that?

A Yes, I do.

Q All right, sir. Could you please give me your current residence address?

A 517 Riblett Lane, Wilmington, Delaware 19808.

Q Are you currently employed?

A No.

Q What was your last place of employment?

A Hardcore Composites.

Q And when did your employment there end?
A January. December 2004, January 2005.
Q I want to go back a little bit in time and then we'll work our way forward. I'd like to go back to your educational background. What was the highest grade that you completed as far as formal schooling?
A Bachelor's, college.
Q Let me take you one step back, then. High school. Where did you graduate from high school?
A Concord High School, Wilmington, Delaware.
Q And when did you graduate?
A '81. 1981.
Q Did you go to college the fall semester following your graduation from high school?
A Yes.
Q Where did you attend, at least begin your college studies?
A University of Delaware.
Q Did you graduate from the University of Delaware?
A Yes, I did.
Q When did you graduate?
A 1985.
Q And what was your degree in?
A Engineering. Bachelor of engineering.
Q Was it a particular area of engineering, such as

chemical engineering, mechanical engineering, civil engineering?

A Mechanical, structural.

Q Now, what did you do after graduation, either from an educational perspective or an employment perspective? Did you go to work, continue schooling?

A Yeah, I went to work.

Q Where did you go?

A For the first year out of college, I worked for myself just doing some general contracting work.

Q When you say contracting work, was it in the field of mechanical engineering or was it in carpentry, building? What type of work?

A It was in concrete work.

Q All right. At the end of that year, then, what did you do as far as work or employment?

A Then I started working for a company called Gilman Development Company.

Q What kind of work did they do?

A They were a housing developer.

Q What did you do for them?

A I was their project manager. I supervised the infrastructure, installation, roads, the sewers.

Q You say housing developer. Would this be residential development?

A Yeah, residential developments.
Q How long did you remain at Gilman, approximately?
A A couple years.
Q Was that in the general Delaware area?
A Yeah, it was in the Delaware area.
Q What did you do next from a vocational and work standpoint?
A I started working for myself again for a while.
Q Doing what?
A Heavy concrete work. Meaning like more commercialized concrete construction.
Q This second time when you were working for yourself, did your business have a name?
A Yeah. Phoenix Construction Services.
Q And what was your primary place of business or address that you worked out of as Phoenix Construction Services?
A 442 Townsend Road, Newark, Delaware.
Q And how long did you do that?
A About two years, I think.
Q Now, you mentioned that it was more commercialized. Could you give me an idea of the sorts of products, for lack of a better word, or types of projects you were working on with concrete?
A I was doing more involved. I was involved in some

concrete -- heavy concrete restoration, underpinning, foundation repairs. Some geotechnical stabilization work.

Q All right. Then after your couple of years with Phoenix, what did you do next?

A I went to work for a company called Structural Preservation Systems.

Q Where were they located?

A I was working out of the Hackensack, New Jersey, office. Their corporate headquarters is in Baltimore.

Q What did you do for them?

A I was a project manager.

Q And what kind of work did Structural Preservation Systems do?

A Concrete repair.

Q Were there particular types of structures on which they did repair, bridges, roads, buildings?

A Bridges, parking garages, big buildings, high rise buildings.

Q And how long did you stay with Structural Preservation Systems?

A I worked for them for a year. A little over a year.

Q What did you do next?

A I got hired by a company called Culbertson Restoration.

Q Culbertson?
A Culbert. C-u-l-b-e-r-t-s-o-n. Restoration.
Q And where were you based and where were they based?
A Both out of -- they have multiple offices but I was based out of West Chester, Pennsylvania.
Q Your general duties for Culbertson?
A I started out as a project manager and worked my way up to the operations manager.
Q And what kind of work did Culbertson do?
A Same kind of work.
Q Same kind of project, bridges, parking garages, high rise buildings?
A Yeah. Correct.
Q How long did you remain with Culbertson?
A Almost six years.
Q And what was your next place of employment?
A Hardcore DuPont Composites.
Q Can you give me the year or the approximate year you began with Hardcore DuPont?
A April 1997.
Q And what was your initial position or title with Hardcore DuPont?
A I came in to -- I don't really know exactly what the title was. I came in to head up the construction

products side of their business.

Q And how long did you remain with Hardcore DuPont?

A For the rest of their existence, I guess, if you want to say that.

Q And that was until when?

A That was end of 1998. Wait a second. Times get kind of messy. '98, I think. I believe.

Q So that would put you at Hardcore for a little over a year, April '97? About a year, year and a half?

A About a year and a half, I guess.

Q And what was your position and/or duties at the end of that period, '98?

A Same, really.

Q Now, you indicated that, generally, the work that was involved there was the construction products side of Hardcore DuPont. Were there specific products or specific types of products that you were involved in while you were with Hardcore?

A Yeah. I was involved in the pilings, the bridges, the fendering systems and other miscellaneous things.

Q What happened at the end of 1998?

A The joint venture between DuPont and Hardcore got dissolved.

Q And did Hardcore go somewhere else then basically?

A Yeah. The business got split in half. It's

pretty complicated. But the construction products side of the business got bought by a company called Harris Specialty Chemicals.

Q Harris Specialty Chemicals?

A Yeah, Harris Specialty Chemicals.

Q And is that the side of the company that you went with?

A Yes, it is.

Q Incidentally, going back. Hardcore DuPont, was that based in Wilmington?

A New Castle, yes.

Q And did you have a title or position when you moved over to Harris Specialty Chemicals?

A Vice-president.

Q And your duties at Harris were what?

A Basically overseeing the whole operation of their division, company, whatever you want to call what we were.

Q And did the area of construction products remain similar to that that you were doing with Hardcore, that is pilings, fendering systems?

A Yes.

Q How long did you remain at Harris or with Harris?

A About five months. And then Harris got bought by SKW Americas.

Q So to some extent, was that just a name change

from your perspective, your job, your duties?

A Yeah. We were just -- Harris -- we were a division of Harris, Harris got -- or a wholly-owned subsidiary or whatever was it was. Harris got consumed or bought by SKW Americas. So nothing really changed. Just our paychecks looked different.

Q So that was about five months into your time at Harris?

A Correct.

Q So how long, then, did you stay at SKW Americas?

A About a year.

Q Then what happened?

A SKW Americas got bought by Degussa.

Q Did that buyout result in any change in either your title, position, duties or the focus of the work that you were doing?

A No.

Q How long did you continue under the Degussa umbrella?

A Into 2000. Into 2000.

Q Then what happened?

A Then Degussa decided that they didn't want to have a composite division, company, whatever. And decided they were going to shut it down or offered it for sale to myself.

Q So at some point, then, you or a combination of

people then purchased something from Degussa?

A Correct. Myself and a company called Zoltek.

Q Z-o-l --

A Z-o-l-t-e-k.

Q T-e-k?

A T-e-k.

Q So Hemphill individually and the company, Zoltek, became the shareholders of a new company?

A The new LLC. And that's where Hardcore Composites Operations, LLC, came from.

Q And the year of that was what?

A 2000.

Q And where did Hardcore, when it began business, where did it begin business?

A Same place. It never moved.

Q And I'm sure I have it in here. But the location of Hardcore Composites was what?

A 618 Lambsons Lane.

Q Now, in 2000 when you began at Hardcore, what was your employment position? I appreciate you were a shareholder in the company. But what was your position in the operation side?

A President.

Q President and chief executive officer?

A Yeah. Whatever. I mean I was in charge of the

whole thing.

Q From the beginning until the end? From the beginning Hardcore Composite, LLC's, operations?

A Correct.

Q And that began, you said, sometime in 2000 and continued until December '04, January of '05?

A Correct.

Q Going back for a moment. You told me about your educational background. You never returned to college and received any type of further degrees such as a master's degree?

A No. Just a bachelor's.

Q Do you have any type of licenses or certifications in any areas of specialty?

A Well, I mean I'm certified in a number of things that may or may not be pertinent I think to what you're looking for.

Q First of all, let's start in any type of engineering area. Do you have any type of certification, professional engineering certifications?

A I'm an engineer in training. I have never gone and gotten my PE or actually needed it.

Q Any other type of certifications in the engineering field?

A No.

Q What about certifications in the field that we are interested in here, the composite field, the concrete field?

A Nothing I think that you're looking for. I mean I have a lot of safety certifications and that sort of thing. But I know what you're looking for. No.

Q So nothing that would be specific to shall we say the construction of composite products, the installation, construction, manufacture of composite products?

A No.

Q Or to the formulation of concrete or the installation of concrete?

A No, not what you're looking for.

Q Let's change topics just for a minute.

As you know, this case is about patent infringement. You personally, are you the owner of any patents?

A Yeah. I have three patents.

Q Can you give me the time or the approximate time that these patents were issued?

A 2001 to 2004. Something like that. Sorry. I wasn't prepared for that question.

Q And if we could just take these one at a time. Could you tell me just a little bit about what the patents are, what they cover?

A One of them is a patent concerning a composite

product for the composite end or non composite products for the repair of concrete.

Q Okay.

A Another one is a method for manufacturing composites.

Q Okay.

A The third one is a method for manufacturing composites.

Q And you, that is Scott Hemphill individually, are the owner of those three patents?

A Correct.

Q Are you also the inventor of those three patents?

A Yes, I am.

Q Are there any co-inventors?

A One of them -- one of the two --

Q Method?

A Method patents have a co-inventor.

Q And who is the co-inventor?

A There is a -- George Green is one co-inventor. I'm kind of drawing a blank here. I can't actually answer the other ones. There is like two others.

Q Two others on the same patent?

A Yeah. There was three people, three additional people besides myself on the one patent because they helped. They helped me work on it. So I needed to put them down.

Q Have you assigned those patents to anyone?
A They were assigned to Hardcore Composites and then they got assigned back to me.
Q When Hardcore Composites ceased operations?
A No, when it switched ownerships.
Q Maybe I missed that. At some point, did Hardcore switch ownership?
A When it went from -- you missed a step in there.
Q Okay. Why don't you help me out?
A You didn't ask the question so I didn't answer it.
Q That's fair enough. I didn't ask it, you don't have to answer it.
A At a point in time, Zoltek -- I bought Zoltek companies out of Hardcore Composites.
Q And when or approximately when did that occur?
A At the end of 2002, I believe.
Q When you bought Zoltek out, did somebody else come in?
A No.
Q Now, what happened with the assignment of the patents in connection with the Zoltek sale or purchase?
A The patents got reassigned to me, back to me personally.
Q After Zoltek was bought out?
A Yeah. Correct.

Q Switch topics again.

In preparation for today's deposition, did you review any documents?

A Not in the last -- that would be no.

Q Did you meet with anybody to prepare for today's deposition?

A Other than myself, no.

Q Now, we were discussing shortly before we got started here today, in the course of discovery of this matter, you have produced a series of records and documents. And certainly in those documents, there is some reference to the DuPont Hardcore -- is it DuPont Hardcore or Hardcore DuPont? Let me get the correct terminology.

A We need to clarify this probably for the discussions today. Hardcore Composites, just for -- just so we are all on the same page. Hardcore Composites got started back in like '91 or '92. Okay. Or actually even before that, I believe. It might have been in the eighties.

Q Okay.

A And then Hardcore Composites and the DuPont Company came together to make the two, to become Hardcore DuPont Composites. I believe that was in like '92 or '93 or something like that.

Q And then you joined in '97?

A In '97 now, the name Hardcore Composites floated

along. There was like a trade name from the beginning. So you need to be clear as to what you're asking about, like time frame-wise today.

Q All right. Fair enough.

Well, let me ask, then. Before you joined Hardcore Dupont Composites in 1997 --

A Correct.

Q Did you have any type of connection, business relationship, with Hardcore Composites and in any of its iterations?

A Only that I had gone to college with the owner of Hardcore Composites.

Q And who are you referring to?

A George Tunis.

Q So you knew him from college at the University of Delaware?

A Correct.

Q And as you understand it, sometime prior to 1990, Hardcore Composites started business operations under some name before 1990?

A Correct.

Q So from that period, let's just say it was late eighties when it began business operations, did you, Scott Hemphill, have any professional dealings with Hardcore Composites?

A No.

Q We are going to be talking about various products and technologies during the course of the day today. And I'm hoping to find some sort of terminology that we can agree and that you can work with here. And I'd like to start with using the term composite tubes or composite tubular piling. It's a phrase that's later used by Hardcore Composite and I'll show you the document later. Does that phrase have some meaning to you? Is it understandable to you?

A Yeah. But I think we need to clarify it, especially given the issues that are at hand.

Q All right. Well, what are the different meanings that that term could have, then, if we just use the phrase generically composite tubular piling?

A Well, I guess what we need to clarify or what we need to discuss here, and this is probably the basis of this whole issue, is the difference between a composite tube and a composite tube that's used as a piling.

Q All right. Let's talk about the difference, then. Is it just a use issue or is it a construction issue that you're concerned about here by using the term composite tube versus a composite tube used as a piling?

A I think there is two issues that surround that. Again, which is I think the basis of why we are here.

There is a method, a manufacture issue and then there is a use issue.

Q If we talk about the concept of composite tube for a moment and take out the use issue, there would still be, from your perspective, an issue of method of manufacture, then, if I dropped the reference to piling?

A Correct, yeah. That is a number of ways to make a composite tube, which would be a tube made out of composites.

Q And a composite tube can be filled. First of all, it's hollow, the tube itself is hollow? When we use the phrase composite tube, we are talking about something that has a hollow section?

A Correct. I think we should define all our terms here. The tube would be a hollow tube, like a straw or a pipe.

Q Okay. And when we use the phrase composite tube, are we talking about a device, shall I say, that can be filled, that hollow space can be filled, with some material?

A With something if you want to. Or it can carry. Or it can be used as a pipe and carry something.

Q Okay. Does that in any way change the use of the phrase? I can use composite tube and that would include in the universe of devices or objects in there, hollow tubes in which some material can be added?

A Can you redefine what you just said a little bit?

Q Yeah. We are eventually going to be talking about composite tubes that are filled with concrete. We are going to get there at some point today.

A Correct.

Q Okay. So all I'm saying, when I use the phrase composite tube, would that, as far as you're concerned, include in that universe the types of composite tubes that we are talking about today that have concrete poured into the hollow space?

A Yeah, it could. I mean that's one use that they could be filled with concrete.

Q Fair enough. Okay.

What I'd like to do is go back to 1997 when you started at Hardcore DuPont. And really before that.

Had you in your various positions that you told me about, that you were employed at, had you used composite tubes filled with concrete in any of the work that you had done before coming to Hardcore DuPont?

A No. I was aware of them but I had not used them.

Q When you got to Hardcore DuPont, was Hardcore DuPont actually manufacturing some sort of composite tubing in which it was inserting concrete into the interior?

A No. They were making composite tube.

Q Were they putting anything into the hollow portion

of the composite tube?

A They weren't.

Q Was somebody?

A Sometimes yes, sometimes no.

Q Okay. Who are we talking about that was putting something into the hollow portion of the composite tubes?

A The eventual purchaser of these contractors.

Q The composite tube that was at Hardcore DuPont in 1997, was that -- we talked about a method of manufacturing issue. Were there multiple ways in which it was being manufactured by Hardcore DuPont in '97?

A That's a -- let me clarify your answer.

Hardcore DuPont or Hardcore, it's the same, Hardcore DuPont or Hardcore, was in the vacuum assisted resin transfer molding business, which is VARTM for short. V-A-R-T-M, an acronym. It stands for vacuum assisted resin transfer molding.

Q Okay.

A That's the general methodology that Hardcore practiced. There is a number of other ways to make it a tube out of composite, which would be filament winding, hand layup, you know, chopper gunning it, protruding it. There is a whole plethora of ways to make a tube out of composites. Then even in the VARTM process, there is a whole number of ways to make a tube using VARTM.

So there was various ways being done within Hardcore using VARTM at the time. So to clarify your answer.

Q Okay. So Hardcore was using VARTM but there were multiple methods even within the VARTM technology?

A Correct.

Q Now, did you have some specific assignment or involvement with that portion of the business when you got there?

A Well, two parts of it. One was to, my initial job when I first got there was to kind of oversee the construction products. Just to get an overview and start it in a direction towards market. Because none of these products at that time were in the marketplace per se. It was all still emerging technology.

I was hired specifically to build a bridge called Magazine Ditch, which was the first composite bridge to be put in in the country. And it was going to be -- it was a composite bridge with reinforced concrete, post tension beams sitting on composite tubes, pilings, with a cap put on it. I mean it was kind of a cutting edge, you know, government-funded project.

Q So the technology was already there, you were being brought in to actually oversee the installation?

A When you say the technology was already there.

They were already producing composite tube and bridge deck by a certain method using VARTM.

One of the other tasks that I was assigned with was that that process was not robust, repeatable or economical.

Q The ultimate project, was that going to involve pouring something into this composite tubing? You said it was going to be sitting on composite tubing. Was something going to be poured into that composite tubing?

A As part of the -- the piles were driven hollow. And the pile cap on those was tied in to the top of the hollow piles with some concrete.

Q So the cap would have concrete but there wouldn't be concrete poured throughout the entire longitudinal line?

A No. On that particular project, the piles were driven, you know, hollow right into the ground. So what was left sticking up out of the ground got rebar into it and concrete to tie the top of the bridge pier into it. So that basically it would pop off.

Q Now, we talked about composite tubing being used as a piling here, correct?

A Correct.

Q All right. Was there something unique about either the method of manufacturing or the product itself that takes it to something other than composite tubing? We

were talking earlier, that when we talk about composite tubing, we got issues, both in terms of manufacture and in terms of use?

A Correct.

Q Now, the tubing that was being used in this first project, let's say, was there something unique about it, something different about it that, made it more appropriate for use as a piling?

A Again, what's starting to happen is you're generalizing concepts like engineering concepts, lumping them all together. In a piling situation, there is two distinctly different types of pilings.

Q All right. And they are --

A There is what would best be described and is called a fendering piling, meaning that its use is for a ship to dock up against, like to dock up against it and the pile is meant to absorb some energy. As the ship docks, the piles deflect somewhat or get rubbed up against. So sometimes they are free-standing, sometimes they are up against the side of a dock so that the ship docks against it and the pilings bend and come back. And the act of bending absorbs the docking energy out of the ship instead of the ship smashing into the dock.

Q Okay.

A So that's a fendering kind of a situation.

Q Um-hmm.

A Sometimes the pilings might have like a bunch of whalers through and be driven, have a bunch of horizontal either piles or timbers bolted to them to connect them together so a couple will act as a system. They may have a fender panel bolted to them. It kind of gets kind of involved.

And then you have what would be called a load bearing piling or bearing, a bearing piling.

Q All right. Now, as far as the composition or construction of the pile itself, is that different when we talk about a fendering, a whaler or load bearing?

A Yeah. It's going to be distinctly different. And that was one of the piles that Hardcore was manufacturing were unique in that aspect.

Q Okay.

A And that's where the VARTM process came into play.

Q Because there was a different method of manufacturing the piling depending on its ultimate use if it was going to be fendering for whaling or for load bearing?

A The method of manufacturing was more or less the same. The art, let's call it the design, the architecture of the pile was distinctly different.

Q Is there a lay version of what the difference is as you move from these three different types of uses for

piling?

A The best way I could describe it is that -- I think we might have to back up just a tiny bit and say when we are talking about composite material, the composite materials we were talking about in this whole discussion are basically fiberglass, is basically what the lay person would understand is fiberglass.

Q All right.

A Okay. Fiberglass comes in basically two different forms. It comes in these rovings, which are like a piece of string just spooled up on a big reel effectively.

And that string is then, in case of the -- it's called the tubes we are discussing. Either soaked in resin and wrapped around like a form or a mandril to make a tube. So you can picture just wrapping string say around a pencil back and forth and having it kind of like a paste on it or glue on it, it gets hard and you pull the pencil out and you have the tube that's left.

So you can either do it like that or they'll take that individual roving and send it to a special machine which chops it into little bitty pieces and mixes it with the resin adhesive and sprays it on the same mandril. That's fiberglass that most people are most familiar with. It's like what an outhouse or bathtub or something looks like when you look at the back side of it. It's all little

chopped up fibers.

That chopped up fiber one would be the weakest form of fiberglass composite. They call it the filament winding is when you're talking in terms of a tube, is probably the next layer, the next level of strength. The problem in filament winding is, if you can imagine you're wrapping the string around a tube and the faster you move like the -- call it the creel back and forth, you can change the angle of the string. If you move it slowly along it, you're just going to wrap it right next to each other. If you move it quickly, you're going to get longer. The angle that the string is making to the longitudinal axis is going to start to change. But it can only get to about 15 degrees or what happens is like, because of physics and geometry, you're going to get too much slack in the string and it would all ball up. Because it won't stay wrapped around the thing. So you can get about 15 degrees or so off, call it off the axis up to about 15 degrees. And after that, it will just kind of all come unglued or all come apart.

The problem with that scenario is that you get a tube, a tube out of the composite, that's very strong in what you would call like the hoop strength, meaning that it doesn't want to go out this way. But if you can imagine, there is not a lot of strength running

longitudinally with the tube. Because all that you can get is this one string that's wrapping at a certain angle that's not there.

So there is strength in terms of being able to completely bend, like bend in half, that drops dramatically.

That strength becomes important when you want to have a load type bearing pile because when something gets squished, you have to resist the side force. It's like if you guys have ever, from a lay person's term, if you have ever got an empty beer can and stand on it and you can stand on the can. As soon as you dink the side of it, it changes on you. That's what will happen if you don't have lots of strength longitudinally in the part. It starts loading and the tiniest little bit of side load and it just collapses.

Q All right.

A Okay. And that also reduces how, when it's just a free-standing kind of call it a fendering situation, how much load it can take before you just bend it in half. And it breaks around say a wrapped up, when it's just filament wound.

So going to that, what Hardcore at the time was doing was using a VARTM process, which is you take dry fiberglass mat, meaning that there is fiberglass that

comes in a fabric form. It's actually a fabric. And fabric has been made in a certain way such that there is fibers in the up and down the length of the fabric, there is fibers transverse and then there is fibers that are like call it plus or minus 45 degrees. So you have this, you know, four directional heavy fabric.

And what Hardcore practiced was taking the dry fabric, basically making a mold, putting dry fabrics, layers of this dry fabric in a mold so you had lots of fibers running straight up and down, like continuously the whole length of the tube, putting the tube, sealing up the mold, putting the tube under vacuum, which would evacuate all the air out of it. And then since nature abhors a vacuum, if you took the resin and put the resin in it, the vacuum would suck the resin through the fabric, saturating the fabric. And then when it would get hard, it would be a tube.

So you would end up with a tube that has uniquely distinctly different properties, physical engineering properties, than a tube made in a different way.

Sorry for the long-winded discussion.

Q I appreciate that.

All right. The VARTM method you just talked about here, was Hardcore using that for the manufacture of the

pilings, whether they were load-bearing, whether they were fendering or whether they were whalers?

A Correct. They were using it for the manufacture of tube, of composite tube.

Q All right. So we, in terms of the time line here, we were talking about your initial project and the bridge that you had been pretty much assigned to be working on. And you're telling us about the various duties that you had as you brought that project to life. Did that project actually go forward?

A Yeah, it did.

Q The bridge project. Okay. All right.

What I'd like to do is just explore with you the progression of your duties there and the progression of this product.

A Now, which product are we discussing?

Q Well, I'm talking about specifically the tubing product and how it was taking the different paths, different things were done to it. So let me just go back to the concept of what you were doing after that bridge project.

What was the next major project that you had while you were at DuPont Hardcore?

A In terms of time, I'm going to have to pass on it. We are doing so many different things that I can't chronologically tell you which one was next. The evolution